Other STDs
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Nongonococcal Urethritis

A. Clinical picture

Nongonococcal urethritis (NGU) is characterized by the development of an inflammatory urethral response (discharge, dysuria, PMNs) in the absence of gonococcal infection. Many cases of NGU are caused by *C. trachomatis*, but most cases are chlamydia-negative. Other agents implicated include *Mycoplasma hominis*, *Ureaplasma urealyticum*, *Trichomonas vaginalis, Mycoplasma genitalium,* and occasionally herpes simplex virus. Typically, the urethral discharge of NGU is less purulent and more mucoid than seen in gonococcal infections, although aggressive infections may generate quite a purulent discharge that mimics gonorrhea.

> Urethritis, manifested by urethral discharge, dysuria, or itching at the end of the urethra, is the response of the urethra to inflammation of any etiology. The characteristic physical finding is urethral discharge, and the pathognomonic confirmatory laboratory finding is an increased number of polymorphonuclear leukocytes (PMNL) on Gram stain of a urethral smear or in the sediment of the first-voided urine. (Martin DH, Bowie WR. Urethritis in Males, in Holmes KK, et al (Eds.). *Sexually Transmitted Diseases* (3rd Ed.); 1999, p.833.)
>
> . . . . . persuasive evidence suggests that *C. trachomatis* causes 35 to 50 percent of NGU in heterosexual men. However, recent studies suggest that the proportion of NGU cases attributable to chlamydia may be declining in regions where chlamydia control programs have been in place.
>
> Clinically, chlamydia-positive and chlamydia-negative NGU cannot be differentiated on the basis of signs or symptoms. Both usually present after a 7 to 21 day incubation period with dysuria and mild to moderate whitish or clear urethral discharge. Examination reveals no abnormalities other than the discharge in most cases; associated adenopathy, focal urethral tenderness, and meatal or penile lesions should suggest herpetic urethritis.
>
> Postgonococcal urethritis occurring in heterosexual men, like NGU, frequently results from infection with *C. trachomatis*. These patients probably acquire gonorrhea and chlamydial infection simultaneously but, because of the longer incubation period of *C. trachomatis*, develop a biphasic illness if their original gonorrhea is treated with an agent that does not eradicate chlamydia. (Stamm WE. *Chlamydia trachomatis* Infections of the Adult, in Holmes KK, et al (Eds.). *Sexually Transmitted Diseases* (3rd Ed.); 1999, p.833.)
>
> The proportion of cases of NGU that are not sexually transmitted has not been defined since *C. trachomatis* was recognized as a cause of NGU. Bacterial urethritis may occur in association with urinary tract infection, bacterial prostatitis, urethral stricture, phimosis, and secondary to catheterization or other instrumentation of the urethra. Urethritis is also described with congenital abnormalities, chemical irritation, and tumors. Stevens-Johnson syndrome may produce urethritis. (Martin DH, Bowie WR. Urethritis in Males, in Holmes KK, et al (Eds.). *Sexually Transmitted Diseases* (3rd Ed.); 999, p.833.)

B. Diagnosis

1. Document urethritis by at least **two** of the following (a **plus** b, **or** a **plus** c, **or** b **plus** c):
   a. Symptoms: History of urethral discharge and/or dysuria
   b. Examination: Presence of purulent or mucopurulent urethral discharge
   c. Laboratory documentation of urethral inflammation:
   i. Urethral Gram-stained smear showing ≥5 PMNs per 1000X (oil immersion) field in at least three fields in areas of maximal cellular concentration.
   ii. If Gram stain is nondiagnostic or not available, evaluate first-void urine specimen: positive leukocyte esterase (LE) test or microscopic exam of unspun urine showing ≥10 WBC per high-power field are consistent with urethritis.

2. Exclude gonorrhea: Gram stained smear of urethral exudate negative for GNIDs, confirmed later by negative genetic probe DNA test, culture, or DNA amplification test for *N. gonorrhoeae*

3. Obtain urethral test for *C. trachomatis*

NOTE: Patients who have symptoms but no signs or laboratory evidence of urethral inflammation should be reexamined when they have not urinated for >4 hours. Symptoms alone, in the absence of signs or laboratory evidence of urethral inflammation, are not a sufficient basis for treatment (or re-treatment). On the other hand, a urethral Gram-stained smear showing ≥5 PMNs per 1000x (oil immersion) field on two occasions at least five days apart is diagnostic of urethritis, even in the absence of symptoms or other criteria.

C. Treatment (See CDC STD Treatment Guidelines in the appendix)

1. Initial or isolated episode (no episode within the previous six weeks)

Recommended

   a. Azithromycin 1.0 g PO single dose; **OR**
   b. Doxycycline 100 mg PO bid for seven days (contraindicated in pregnancy); **OR**

Alternative

   c. Erythromycin base 500 mg PO qid (or enteric coated erythromycin base 666 mg tid) for seven days; **OR**
   d. Erythromycin ethyl succinate (EES) 800 mg PO qid for seven days; **OR**

e. Ofloxacin 300 mg PO qid for seven days (contraindicated in adolescents [age <18] or in pregnant or nursing women)

2. In case of severe GI intolerance with erythromycin, give the drug with food, halve the dose, and double the duration of therapy (14 days)

3. Symptomatic persistent or recurrent NGU
   Recommended
   a. Metronidazole 2g PO single dose **PLUS** erythromycin or azithromycin as above
   Alternative
   b. Poor compliance or partner not treated: repeat initial regimen
   c. Good compliance and partner treated
      i. Consider wet mount exam and culture for Trichomonas
   d. Recurrence of urethritis after a one week trial of doxycycline followed by a one week trial of erythromycin: use erythromycin 500 mg PO qid (or 666 mg tid) for three weeks; or doxycycline 100 mg PO bid for three weeks. Multiple or prolonged courses of antibiotics have not been shown to be of clear benefit
   e. Failure rates are substantially higher for nonchlamydial NGU than for chlamydial infection, regardless of treatment regimen. Advise sexual abstention until symptoms have resolved and treatment has been completed.

NOTE: Some men with persistent urethral symptoms may have prostate gland disease, especially if accompanied by perineal or testicular discomfort. However, the diagnosis of chronic prostatitis is difficult, time-consuming, and often unreliable. Such patients usually should be referred to an urologist rather than undergoing digital prostate examination or other work-up in the STD clinic setting.

D. Sex partners

1. Initial or isolated NGU: Evaluate and treat all partners within the past 60 days. Partners should generally be treated empirically with antichlamydial regimens, even though most will test negative for chlamydia.

2. Recurrent NGU: The need for and value of treatment are unknown. The approach should be individualized on the basis of available clinical, epidemiologic, and microbiologic data. Emphasize abstinence or condom use during treatment. Once sex partners have been treated or documented to be free of infection, repeated evaluation and treatment of the partner usually are not indicated.

Mucopurulent Cervicitis

A. Clinical picture

Mucopurulent cervicitis (MPC) has been called the female counterpart urethritis in males. It can be caused by infection with *N. gonorrhoeae* or *C. trachomatis,* although most cases test negative for both gonorrhea and chlamydia. The syndrome is characterized by mucopurulent cervical discharge and a cervical inflammatory response (friability, edema, ectopy, increased numbers of polymorphonuclear leukocytes [PMNs]). Persons with increased PMNs on cervical Gram stain alone (cervical leukocytosis), in the absence of other observable evidence of cervical inflammation, probably should not be treated empirically since this is a poor predictor of gonococcal or chlamydial infection. Patients with MPC may note vaginal discharge, dyspareunia, post-coital or intermenstrual bleeding, or other non-specific symptoms. Interpretation of the cervical Gram stain has not been standardized.

B. Diagnosis

1. Document clinical MPC by the presence of criterion (a) below **AND** at least one other criterion (b, c, **or** d):
   a. Endocervical Gram-stained smear with a monolayer of ≥ 15 PMNs per 1000X (oil immersion) field, in a specimen obtained from the endocervix after cleaning the ectocervix with a swab to wipe the cervix free of vaginal epithelial cells or menstrual blood, and in absence of primary herpes, trichomoniasis or candidiasis
   b. Purulent endocervical discharge or positive "swab test" (yellow or green color on endocervical swab)
   c. Hypertrophic or edematous cervical ectopy
   d. Endocervical bleeding induced by gentle swabbing
2. Perform tests for gonorrhea and chlamydia
3. Exclude presence of GNIDs on cervical Gram-stained smear
4. Consider other potential causes of cervical inflammation
   a. Herpetic cervicitis
   b. Trichomoniasis
   c. Candidiasis
   d. Vaginitis due to a foreign body or chemical irritation
   e. Presence of IUD, ectopy, oral contraceptives, and menses may be associated with PMNs in endocervical smears and perhaps with other signs of MPC.

5. In general, treatment is not indicated for patients with cervical leukocytosis (≥15 PMNs per oil-immersion field) and no other physical evidence of cervical inflammation. Treat only if test results indicate.

C. Treatment of presumptive nongonococcal MPC (See CDC STD Treatment Guidelines in the appendix)

CDC recommends basing treatment for MPC upon the results of gonorrhea and chlamydia tests - in general, treatment may be withheld pending the outcome of these test results. In certain circumstances, it may be appropriate to provide empiric therapy before test results are known, for example, if likelihood of infection is high, or if patient follow-up cannot be assured. In these cases with documented MPC and negative gonococcal Gram stain, the following empiric therapy may be offered:

1. Antichlamydial therapy
   a. Azithromycin 1.0 g PO single dose; **OR**
   b. Doxycycline 100 mg bid for seven days (contraindicated in pregnancy); **OR**
   c. Erythromycin base or stearate 500 mg PO qid (or enteric coated erythromycin base 666 mg tid) for seven days -- in case of severe GI intolerance, give the drug with food, halve the dose, and double the duration of therapy (14 days)

2. If gonococcal infection is likely on clinical or epidemiologic grounds, precede treatment with a single-dose gonorrhea regimen

D. Sex partners

1. All current sex partners should receive full STD evaluation. While CDC does not specify a contact interval for partner evaluation, it is probably most important to evaluate those partners within the past 30 days of diagnosis or onset of symptoms.
2. If NGU or gonorrhea present, treat accordingly
3. If no urethritis is documented in the partner, it is generally safe to defer treatment pending results of tests for gonorrhea and chlamydia. However, empiric therapy at the time of initial examination may be indicated if follow-up cannot be assured.

Bacterial Vaginosis

A. Clinical picture

Bacterial vaginosis (BV) is the most common cause of vaginitis symptoms among women of childbearing age. Previously called nonspecific vaginitis or Gardnerella-associated vaginitis, BV is associated with sexual activity.

BV is a clinical syndrome characterized by the presence of malodorous vaginal discharge, with or without vaginal pruritus. The fish-like odor is noticeable especially after intercourse. Usually there is no external genital irritation or dysuria, and nearly half of the women with clinical signs of BV report no symptoms. The discharge is generally a homogeneous, non-viscous, milky-white fluid that smoothly coats the vaginal mucosa and cervix. Imbalance of the normal vaginal flora is thought to play a role in the etiology of BV. Instead of Lactobacillus bacteria being the most numerous, increased numbers of organisms such as *Gardnerella vaginalis*, Bacteroides, Mobiluncus, and *Mycoplasma hominis* are found in the vaginas of women with BV. Investigators are studying the role that each of these microbes may play in causing BV, but they do not yet understand the role of sexual activity in developing BV. A change in sexual partners and douching may increase the risk of acquiring BV. While the evidence for sexual transmissibility of BV is controversial, the condition is uncommon in sexually inexperienced females.

> The Pediatric Red Book, addressing the issue of potential sexual abuse in children, states that "while . . . . . Gardnerella vaginalis infection, [and] bacterial vaginosis, ... can be transmitted sexually, other modes of transmission may occur. The discovery of any of these conditions in a prepubertal child does not warrant child protective services involvement unless the clinician finds other information that suggests abuse." Elsewhere the Red Book states that "diagnosing BV in a prepubertal girl raises concern about, but does not prove, sexual abuse." (2000 Red Book, p.143, 184)

Researchers have shown an association between BV and pelvic inflammatory disease (PID), which can cause infertility and tubal (ectopic) pregnancy. BV also can cause adverse outcomes of pregnancy such as premature delivery and low-birth-weight infants.

(References: NIAID. Fact Sheet - Vaginitis Due to Vaginal Infections. June 1998. http://www.niaid.nih.gov/factsheets/stdvag.htm)

B. Diagnosis

Vaginal secretions characterized by **at least three of the following:**

- ❖ Amine (“fishy”) odor before or after addition of 10% KOH
- ❖ pH≥4.5 (unreliable if blood present)

- ❖ Homogeneous, smooth, non-inflammatory discharge
- ❖ Presence of clue cells on microscopic exam

C. Treatment (See the CDC STD Treatment Guidelines in the appendix)

Recommended

1. Metronidazole 500 mg PO bid for seven day; **OR**
2. Clindamycin 2% cream intravaginally qhs for seven days; **OR**
3. Metronidazole 0.75% gel intravaginally qd or bid for five days; **OR**

Alternative

4. Metronidazole 2 gm PO single dose; **OR**
5. Clindamycin 300 mg PO bid for seven days
6. Clindamycin 100 mg (1 ovule) intravaginally for three days
7. Avoid alcohol during treatment with oral metronidazole and for 24 hours thereafter
8. Clindamycin cream is oil-based, may weaken latex condoms and diaphragms
9. Non-compliant patients can be treated with single-dose metronidazole as above, but higher rate of relapse is seen
10. Bacterial vaginosis in pregnancy
    a. BV linked to adverse pregnancy outcomes (PROM, preterm labor, premature birth)
    b. Recommend screening of high-risk women (prior preterm birth) in 2nd trimester, treat with metronidazole 250 mg PO tid for seven days if BV present
    c. **CDC now endorses use of metronidazole in all stages of pregnancy.** While oral metronidazole had traditionally been avoided in the first trimester, two recent meta-analyses demonstrated no teratogenicity in humans.
    d. Clindamycin cream is contraindicated in pregnancy, as two clinical trials showed an increase in pre-term deliveries.
    e. Metronidazole gel, while safe for use in pregnancy, will not treat upper genital tract anaerobes; for this reason, oral therapy is probably preferable to intravaginal therapy for treatment of BV in pregnancy.

D. Sex partners

Routine treatment of male partner(s) with metronidazole does not prevent recurrence of bacterial vaginosis. For recurrent BV without evidence of other STD, recommend use of condoms, avoid douching.

Trichomonal Vaginitis

A. Clinical picture

Trichomoniasis, caused by the single-celled protozoan parasite *Trichomonas vaginalis*, is a common STD that affects both women and men, although symptoms are more common in women. The vagina is the most common site of infection in women, and the urethra is the most common site of infection in men. Trichomoniasis is the most common curable STD in young, sexually active women. An estimated 5 million new cases occur each year in women and men.

> Prevalence rates have ranged from 5 to 10 percent in women in the general population to as high as 50 to 60 percent in prison inmates and commercial sex workers. Women at high risk of acquiring other STDs are often found to have coexistent trichomoniasis. For example, 30 to 50 percent of women with gonorrhea also have had *T. vaginalis* infection. . . . . One carefully controlled study of 13,816 pregnant women from six urban centers reported a prevalence rate of 12.6 percent.
>
> Prevalence rates in different [male] populations have ranged from 0 percent among asymptomatic men at low risk to 58 percent among adolescents at high risk for STDs. Among randomly selected men attending an STD clinic, the prevalence of *T. vaginalis* was 6 percent in one recent study, compared to rates of 1 to 19 percent among men with gonococcal urethritis. (Krieger JN, Alderete JF. *Trichomonas vaginalis* and Trichomoniasis, in Holmes KK, et al (Eds.). *Sexually Transmitted Diseases* (3rd Ed.); 1999, p.589.)

Trichomoniasis is spread through penis-to-vagina intercourse or vulva-to-vulva contact with an infected partner. Women can acquire the disease from infected men or women, whereas men usually contract it only from infected women.

> The high prevalence of *T. vaginalis* among sexual contacts of infected patients strongly supports the view that trichomoniasis is transmitted primarily by sexual contact. In various studies *T. vaginalis* was isolated from 14 percent to 60 percent of male partners of infected women. Conversely, *T. vaginalis* was isolated from 67 percent to 100 percent of female partners of infected men.
>
> In the past . . . . . there was active debate on the route for transmission. Trichomonads survive for up to 45 minutes on toilet seats, washcloths, and clothing and in bath water. . . . . Although nonvenereal transmission by contaminated fomites may explain reports of trichomoniasis in a few patients, such as sexually mature virgins, the data suggest that nonvenereal transmission of *T. vaginalis* is rare.
>
> Perinatal transmission occurs to about 5 percent of female children of infected mothers. Such infections are usually self-limited, with progressive metabolism of maternal hormones. (Krieger JN, Alderete JF. *Trichomonas vaginalis* and Trichomoniasis, in Holmes KK, et al (Eds.). *Sexually Transmitted Diseases* (3rd Ed.); 1999, p.589.)

> Regarding the issue of potential sexual abuse associated with trichomoniasis in children, the Pediatric Red Book states the following: "In a perinatally infected infant, the vaginal discharge can persist for several weeks; accordingly, intense social investigation may not be warranted. However, a new diagnosis of trichomoniasis in an older infant or child should prompt a careful investigation, including a child protective service investigation, for suspected sexual abuse." (2000 Red Book, p.142.)

In women, trichomonal vaginitis is characterized by the development of profuse, purulent, malodorous yellow-green vaginal discharge (occasionally foamy). Cervical petechiae are classically described ("strawberry cervix"), although this finding is seen in a minority of cases. As in BV, the vaginal pH in trichomoniasis is generally $\geq$4.5. The infection may also cause discomfort during intercourse and urination. Irritation and itching of the female genital area and, in rare cases, lower abdominal pain can also occur. Symptoms usually appear within 5 to 28 days of exposure in women.

> The clinical manifestations of vaginal trichomonal infection vary from asymptomatic carriage to severe vaginitis. . . . . The proportion of infected women who have symptoms ranges from 20 to 50 percent. . . . . An inflammatory vaginal discharge may be present in many infected women who lack symptoms.
>
> Left untreated, vaginitis by *T. vaginalis* may develop into a chronic infection, characterized by intermittent symptoms or signs and less severe vulvovaginitis. (Krieger JN, Alderete JF. *Trichomonas vaginalis* and Trichomoniasis, in Holmes KK, et al (Eds.). *Sexually Transmitted Diseases* (3rd Ed.); 1999, p.593.)

Trichomoniasis in pregnant women may cause premature rupture of the membranes and preterm delivery. The genital inflammation caused by trichomoniasis might also increase a woman's risk of acquiring HIV infection if she is exposed to HIV. Trichomoniasis in a woman who is also infected with HIV can increase the chances of transmitting HIV infection to a sex partner.

Most men with trichomoniasis do not have signs or symptoms. Men with symptoms may have an irritation inside the penis, mild discharge, or slight burning after urination or ejaculation. *T. vaginalis* is increasingly recognized as a cause of nongonococcal urethritis and can occasionally be cultured from male urethral swab or first-void urine samples. The symptoms of trichomoniasis in infected men may disappear within a few weeks without treatment. However, an infected man, even a man who has never had symptoms or whose symptoms have stopped, can continue to infect a female partner until he has been treated. Therefore, both partners should be treated at the same time to eliminate the parasite.

T. vaginalis has been isolated from the urethras of 70 percent of men who have had recent sexual contact with infected women. However, 2 weeks after contact only 33 percent of the men were culture-positive. *T. vaginalis* has been associated with urethritis characterized by discharge, dysuria, and rarely, superficial penile ulcerations.

The findings suggest the following conclusions: (1) men with trichomoniasis often have symptoms of urethritis, (2) both spontaneous resolution of trichomoniasis and prolonged asymptomatic carriage occur in men with trichomoniasis, and (3) *T. vaginalis* is a treatable cause of urethritis among sexually active men. (Krieger JN, Alderete JF. *Trichomonas vaginalis* and Trichomoniasis, in Holmes KK, et al (Eds.). *Sexually Transmitted Diseases* (3rd Ed.); 1999, p.593-4.)

To diagnose trichomoniasis, a health care provider must perform a physical examination and laboratory test. In women, a pelvic examination can reveal small red ulcerations on the vaginal wall or cervix. Laboratory tests are performed on a sample of vaginal fluid or urethral fluid to look for the disease-causing parasite. The parasite is harder to detect in men than in women.

(Reference: CDC Division of Sexually Transmitted Diseases. Trichomoniasis Fact Sheet. September 2000. http://www.cdc.gov/nchstp/dstd/Fact_Sheets/FactsTrichomoniasis.htm)

B. Diagnosis

1. Demonstration of motile trichomonads on saline wet mount of vaginal exudate, **OR**
2. Positive culture of vaginal secretions, urethral secretions, or male first-void urine sample for *T. vaginalis* using Diamond's medium or In-Pouch diagnostic. (NOTE: Routine culture not widely available.)

C. Treatment (See the CDC STD Treatment Guidelines in the appendix)

Recommended

1. Metronidazole 2.0 g PO, single dose; **OR**

Alternative

2. Metronidazole 500 mg PO bid for seven days
3. Advise sexual abstention until symptoms improve and partner(s) treated
4. Avoid alcohol during treatment with oral metronidazole and for 24 hours thereafter
5. Treatment failure (persistence or recurrence despite sexual abstention, or after intercourse only with a treated partner): metronidazole 500 mg PO bid for seven days

6. Repeated treatment failure: metronidazole 2 gm PO qd for three to five days. Trichomonas that is resistant to metronidazole should be referred to CDC for guidance.
7. Metronidazole gel is not effective for treatment of *T. vaginalis*
8. Trichomoniasis in pregnancy
   a. **CDC now endorses use of metronidazole in all stages of pregnancy.** While oral metronidazole had traditionally been avoided in the first trimester, two recent meta-analyses demonstrated no teratogenicity in humans.
   b. 2 gm PO single dose metronidazole is preferred regimen in all stages of pregnancy
   c. Intravaginal clotrimazole applied once daily hs for seven days may provide symptomatic relief

D. Sex partners

1. Routine STD examination is appropriate for all sex partners
2. If possible, perform microscopic examination of centrifuged sediment from first void urine sample, looking for motile trichomonads
3. Urine sediment may be cultured using In-Pouch system to increase diagnostic yield
4. Treat all partners with metronidazole 2.0 g PO, single dose.

Trichomonal Vaginitis Web Sites

CDC. STD Facts and Information: Trichomoniasis
http://www.cdc.gov/nchstp/dstd/Fact_Sheets/FactsTrichomoniasis.htm

CDC.Parasitic Disease Information: Trichomonas Infection
http://www.cdc.gov/ncidod/dpd/parasites/trichomonas/default.htm

NIAID. Vaginitis Due to Vaginal Infections (scroll down to section on "Trichomoniasis")
http://www.niaid.nih.gov/factsheets/stdvag.htm

National Network of STD/HIV Prevention Training Centers (PTCs).
Curriculum Outline: Clinical STD Training Courses: Vaginitis (scroll down to "TRICHOMONIASIS")
http://depts.washington.edu/nnptc/core_training/clinical/clinical_curriculum/vaginitis.html

Vulvovaginal Candidiasis

A. Clinical picture

Vaginal yeast infection or vulvovaginal candidiasis (VVC) is a common cause of vaginal irritation. The causative agents are *Candida sp*. yeasts. Doctors estimate that approximately 75 percent of all women will experience at least one symptomatic yeast infection during their lifetimes. Yeast are always present in the vagina in small numbers, and symptoms only appear with overgrowth.

Several factors are associated with increased symptomatic infection in women, including pregnancy, uncontrolled diabetes mellitus, and the use of oral contraceptives or antibiotics. Other factors that may increase the incidence of yeast infection include using douches, perfumed feminine hygiene sprays, and topical antimicrobial agents, and wearing tight, poorly ventilated clothing and underwear. Whether or not yeast can be transmitted sexually is unknown. Because almost all women have the organism in the vagina, it has been difficult for researchers to study this aspect of the natural history.

VVC is suggested by the presence of vulvovaginal soreness, dyspareunia, vulvar pruritus, external dysuria, and vaginal discharge. Vaginal discharge is not always present and may be minimal. The thick, whitish-gray discharge is typically described as cottage-cheese-like in nature, although it can vary from watery to thick in consistency. Patients with VVC may develop exudative candidal plaques adherent to the vaginal mucosa, along with erythema or edema of the introitus or vulva. In contrast to BV and trichomoniasis, the vaginal pH in VVC in generally <4.5. HIV-infected women may have severe yeast infections that are often unresponsive to treatment.

Most male partners of women with yeast infection do not experience any symptoms of the infection. A transient rash and burning sensation of the penis, however, have been reported after intercourse if condoms were not used. These symptoms are usually self-limiting.

(Reference: NIAID. Fact Sheet - Vaginitis Due to Vaginal Infections. June 1998. http://www.niaid.nih.gov/factsheets/stdvag.htm)

B. Diagnosis

1. Clinical presentation consistent with VVC
2. Fungal elements (budding yeast or pseudomycelia) are usually but not always identified in the KOH preparation (less often in saline preparation or Gram stain).
3. Treatment for VVC is usually indicated if clinical features are present, even if yeast is not seen.

4. Demonstration of yeast buds or positive culture for *Candida*, in the absence of signs or symptoms may not require therapy since 10-20% of women normally harbor yeast in the vagina
5. Women with repeatedly negative KOH preparations should be referred to women's health or other appropriate specialist for further evaluation.

C. Treatment (See the CDC STD Treatment Guidelines in the appendix)

1. Intravaginal imidazole cream or suppository treatment, such as clotrimazole vaginal cream or suppository 100 mg daily, at bedtime for seven days, or equivalent dosage of other agent (miconazole, terconazole, butoconazole, etc.); **OR**
2. Fluconazole 150 mg PO, single dose (should be avoided in pregnancy [FDA Category C])
3. In general, intravaginal imidazole cream or suppository treatment is tried first, with fluconazole therapy reserved for recurrent infection

D. Sex partners

Examination and treatment usually not necessary. However, treatment with an imidazole cream (e.g. miconazole, clotrimazole) may be indicated in some cases of recurrent infection, or if the partner has penile candidiasis (balanitis).

Genital Herpes

Overview

For a more complete description of Genital Ulcer Disease Syndrome, refer to the following text:

- Principles and Practice of Infectious Diseases. (5th edition)
- Sexually Transmitted Diseases. (3rd edition)
- CDC Guidelines for Treatment of Sexually Transmitted Diseases

Case Definition

Clinical description

A condition characterized by visible, painful genital or anal lesions

Laboratory criteria for diagnosis

- Isolation of herpes simplex virus from cervix, urethra, or anogenital lesion, or
- Demonstration of virus by antigen detection technique in clinical specimens from cervix, urethra, or anogenital lesion, or
- Demonstration of multinucleated giant cells on a Tzanck smear of scrapings from an anogenital lesion

Case classification

Probable: a clinically compatible case (in which primary and secondary syphilis have been excluded by appropriate serologic tests and darkfield microscopy, when available) with either a diagnosis of genital herpes based on clinical presentation (without laboratory confirmation) or a history of one or more previous episodes of similar genital lesions

Confirmed: a clinically compatible case that is laboratory confirmed

Comment

Genital herpes should be reported only once per patient. The first diagnosis for a patient with no previous diagnosis should be reported.

See also: 1990 Case Definition

Case/Contact Follow Up and Control Measures

See CDC STD Treatment Guidelines

Laboratory Procedures

a. HSV culture
   i. Routine culture testing is recommended for first episode of typical herpes lesions, all atypical lesions and genital ulcers that are otherwise undiagnosed
   ii. Culture testing is optional if classical vesicular or pustular lesions present, especially recurrent lesions
b. HSV antigen detection (IF): currently not widely available
c. Cytologic diagnosis by Tzanck preparation: not currently recommended for routine examination of lesions in STD clinic -- specific but insensitive, also does not distinguish between HSV and VZV infection
d. Type-specific HSV serology: not currently available
e. Perform *stat* RPR and darkfield examination for **all** genital ulcers not typical for HSV (e.g. nontender, solitary ulcers), consider chancroid culture

Other Sources of Information

Red Book, Report of the Committee on Infectious Diseases

Web Sites

http://www.cdc.gov/nchstp/dstd/Fact_Sheets/facts_Genital_Herpes.htm
http://www.cdc.gov/

Lymphogranuloma Venereum

Overview

For a more complete description of Genital Ulcer Disease Syndrome, refer to the following text:

- Principles and Practice of Infectious Diseases. (5^{th} edition)
- Sexually Transmitted Diseases. (3^{rd} edition)
- CDC Guidelines for Treatment of Sexually Transmitted Diseases

Case Definition

Infection with L_1, L_2, or L_3 serovars of *Chlamydia trachomatis* may result in a disease characterized by genital lesions, suppurative regional lymphadenopathy, or hemorrhagic proctitis. The infection is usually sexually transmitted.

Laboratory criteria for diagnosis

- Isolation of *C. trachomatis*, serotype L_1, L_2, or L_3, from clinical specimen, or
- Demonstration of inclusion bodies by immunofluorescence in leukocytes of an inguinal lymph node (bubo) aspirate, or
- Positive microimmunofluorescent serologic test for a lymphogranuloma venereum strain of *C. trachomatis* (in a clinically compatible case)

Case classification

Probable: a clinically compatible case with one or more tender fluctuant inguinal lymph nodes or characteristic proctogenital lesions with supportive laboratory findings of a single *C. trachomatis* complement fixation (CF) titer of greater than 64

Confirmed: a case that is laboratory confirmed

Case/Contact Follow Up and Control Measures

See CDC STD Treatment Guidelines in the appendix.

Laboratory Procedures

a. Isolation of an LGV strain of *C. trachomatis* from urethra, cervix, rectum, or lymph node aspirates
b. Type-specific chlamydial serology may be diagnostic on a single specimen, but acute and convalescent specimens preferred

Other Sources of Information

Red Book, Report of the Committee on Infectious Diseases

Web Sites

http://www.cdc.gov/
http://www.cdc.gov/nchstp/dstd/Fact_Sheets/FactsHPV.htm

Human Papillomavirus (HPV)

A. Clinical picture

Anogenital warts are caused by infection with human papillomavirus (HPV). There are more than 100 different strains or types of HPV. Over 30 of these types are sexually transmitted, and they can infect the genital area, including the skin of the penis, vulva, labia, or anus, or the tissues covering the vagina and cervix.

HPV is likely the most common STD among young, sexually active people and is of increasing public health importance. At any one time, an estimated 20 million people in the United States have genital HPV infections that can be transmitted to others, including an estimated 15 percent of Americans ages 15 to 49.

> Typical prevalence of HPV for women under the age of 25 is between 28 and 46 percent. Although less data are available on HPV among men, levels of current infection in men appear to be similar to those in women.

Fifty to 75% of sexually active men and women acquire genital HPV infection at some point in their lives. About 5.5 million Americans get a new genital HPV infection each year.

> A recent U.S. study among female college students found that an average of 14 percent became infected with genital HPV each year. About 43 percent of the women in the study were infected with HPV during the three-year study period.

Some HPV viruses are considered "high-risk" types and may cause abnormal Pap smears and cancer of the cervix, anus, and penis. Others are "low-risk," and they may cause mild Pap smear abnormalities and genital warts. Most HPV infections have no signs or symptoms.

> All types of HPV can cause mild Pap smear abnormalities that do not have serious consequences. Approximately 10 of the 30 identified genital HPV types can lead, in rare cases, to development of cervical cancer.
>
> Most exophytic warts are due to HPV types 6 and 11. Certain other HPV types, especially types 16 and 18 (high-risk), and 31, 33, and 35 (intermediate risk) have been epidemiologically linked to the development of cervical cancer in women.
>
> HPV type 16 accounts for more than 50 percent of cervical cancers and high-grade dysplasia (abnormal cell growth). HPV type 16, along with types 18, 31, and 45 account for 80 percent of cervical cancers.

The types of HPV that infect the genital area are spread primarily through sexual contact. Because most HPV infections are asymptomatic, most infected persons are completely unaware they are infected, yet they can transmit the virus to a sex partner. Rarely, pregnant women can pass HPV to their baby during vaginal delivery. A newborn that is exposed to HPV during delivery can develop warts in the larynx.

> It appears that genital HPV infections as measured by DNA are transmitted rather easily between sexual partners.
>
> Sexual partners of women or men with HPV-related lesions are more likely themselves to have clinical or cellular evidence of HPV infection. Some series suggest that the majority of regular sexual partners of infected individuals are themselves infected, although the lesions are often subtle and not noticed.
>
> The prevalence of cervical HPV DNA increases with reported numbers of different sexual partners, particularly recent partners. Although HPV type-specific analyses have been limited by small sample sizes, the prevalences of both cancer-associated and non-cancer-associated HPV types are associated with sexual history.
>
> . . . . . the contribution of nonsexual routes of transmission remains unresolved and controversial. . . . . Fomite transmission has been postulated, based on the detection of HPV DNA in gynecologic settings and on underclothes, but transmission by fomites has never been proven.
>
> The transmission of laryngeal HPV infections (often types 6 and 11) supports the notion that vertical transmission of genital HPV infections is possible. . . . . Although vertical transmission of genital types of HPV is certainly possible, the frequency of vertical transmission is still controversial and unknown. (Schiffman MH, Burk RD. Human Papillomaviruses, in Evans AS, Kaslow RA [Eds.]. *Viral Infections of Humans: Epidemiology and Control* [4th Ed.]; 1997, p.1000-1.)
>
> The Pediatric Red Book, addressing the issue of potential sexual abuse in children, states that: "Infections that have long incubation periods (eg, papillomavirus infection) . . . . . are more problematic [in terms of assessing the likelihood of sexual abuse]. The possibility of vertical transmission should be considered in these cases, but an evaluation of the patient's circumstances by the local child protective services agency is warranted in most." It additionally states: "Anogenital warts primarily are transmitted by sexual contact but may be acquired at the time of delivery or by transmission from nongenital sites. When they are found in a prepubertal child beyond infancy, sexual abuse must be considered. . . . . Suspected child abuse should be reported to the appropriate local agency if anogenital warts are found in a prepubertal child beyond infancy." (2000 *Red Book*, p.143, 414-5.)

Genital warts usually appear as soft, moist, pink or red growths or bumps in the genital area. These lesions can be raised or flat, single or multiple, small or large. Some cluster together forming a cauliflower-like shape. They can appear on the vulva, in or around the vagina or anus, on the cervix, and on the penis, scrotum, groin, or thigh. Warts can appear within several weeks after sexual contact with an infected person, or they can take months to appear.

Genital warts are diagnosed by inspection. Visible genital warts can be removed, but no treatment is better than another, and no single treatment is ideal for all cases. There is no "cure" for HPV, although the infection usually goes away on its own. Cancer-related types are more likely to persist. For most (90%) women, cervical HPV infection becomes undetectable within two years; only a small proportion have persistent infection. However, reactivation or reinfection is possible. Persistent infection with certain types of HPV is the key risk factor for cervical cancer.

A Pap smear can detect pre-cancerous and cancerous cells on the cervix. Frequent Pap smears and careful medical followup, with treatment if necessary, can help ensure that pre-cancerous cells in the cervix caused by HPV infection do not develop into life-threatening cervical cancer.

References

CDC Division of Sexually Transmitted Diseases. Genital HPV Infection Fact Sheet. May 2001. (http://www.cdc.gov/nchstp/dstd/Fact_Sheets/FactsHPV.htm)

CDC. Tracking the Hidden Epidemics, Trends in STDs in the United States 2000. http://www.cdc.gov/nchstp/dstd/Stats_Trends/Trends2000.pdf)

Other references as noted in text.

B. Diagnosis

Visual inspection reveals typical “cauliflower” lesions, usually involving the external genitalia, perineum, or perianal area. Differential diagnosis includes molluscum contagiousum or condyloma lata (secondary syphilis manifestation). Warts may be solitary or clustered. Application of a weak acetic acid solution (3-5%) is occasionally used to highlight exophytic warts on the skin surface--affected areas will turn white as the solution dries; however, CDC does not endorse this for routine use as it is insensitive and nonspecific. (NOTE: Do not apply acetic acid to mucus membrane areas). A vaginal speculum examination should be done at the initial presentation of all women with anogenital warts to evaluate for any visible cervical lesions. Similarly, anoscopy to detect warts of the rectal mucosa should be done at the initial visit for all patients (men and women) with anal or perianal warts. Condylomata of the cervix may be documented by colposcopy or cervical cytology, so a Pap smear should be recommended for all women newly diagnosed with warts regardless of when previous cytology was performed.

C. Treatment (CDC STD Treatment Guidelines are in the appendix)

Appropriate therapy can be either provider-applied or patient-applied, depending upon clinical circumstances and patient preferences. Patient-applied therapies are more convenient but require compliance and motivation.

Provider-applied

1. Liquid nitrogen (LN_2)
   a. Treat visible warts, freezing each lesion 10-15 seconds
   b. Allow lesions to thaw, then repeat application
   c. At least two or three treatments are usually required (weekly or every other week)
   d. Patients presenting for follow-up treatment within four weeks of initial visit are **not** required to undergo full STD screening if they have not had sex in the interim period

2. Podophyllin (contraindicated in pregnancy) 10-25% in tincture of benzoin
   a. Apply once or twice weekly until warts resolve
   b. Podophyllin should be washed off one to four hours after the first application -- if there is no unusual pain or inflammation, each subsequent application may remain for four to eight hours or, with a physician's approval, for up to 24 hours
   c. Max. use 0.5 cc per application, max. coverage 10 cm^2
3. Trichloro acetic (TCA) or trichloroacetic acid (BCA) 70-90%
   a. Apply to warts; avoid application to surrounding skin
   b. Powder with talc to remove unreacted acid
   c. Repeat weekly if necessary up to six times

4. Surgical removal
   a. Extensive warts, cervical condylomata, and warts not responding to the above measures over three to four weeks
   b. Modalities include tangential scissors excision, tangential shave excision, curettage, electrosurgery

5. Mucosal warts (except scant vaginal lesions and small, easily accessible, meatal warts): Refer to an appropriate specialist; if meatal warts present, a urological evaluation may be indicated to assess the urethral for additional lesions

6. Interferon therapy and laser surgery are generally considered too expensive for routine use in public health settings

Patient-applied

7. Imiquimod (contraindicated in pregnancy) 5% cream
   a. Apply with fingertip at bedtime three times per week
   b. Wash treatment area with mild soap and water six to ten hours after application
   c. Duration of therapy up to 16 weeks, although warts may resolve within eight to ten weeks or sooner
   d. Safety and efficacy in pregnancy not established

8. Podofilox (contraindicated in pregnancy) 0.5% solution
   a. Apply with cotton swab twice daily for three days, followed by four days of no therapy
   b. Cycle may be repeated as necessary up to a total of four cycles
   c. Max. use 0.5 cc per day, max. coverage 10 sq. cm.

9. Advise patients that despite resolution of visible warts, cure of HPV infection cannot be assured and that warts may reappear. Discuss use of condoms and recommend annual Pap smears for women.

D. Sex partners

Routine STD examination is recommended for all partners, including cervical cytology for female partners of infected men. Discuss likelihood of sub-clinical infection in males and females alike.

Anogenital Warts Web Sites

CDC. STD Facts & Information: Genital HPV Infection.
http://www.cdc.gov/nchstp/dstd/Fact_Sheets/FactsHPV.htm

NCI Cancer Facts: Human Papillomaviruses and Cancer.
http://cis.nci.nih.gov/fact/3_20.htm

NIAID. Human Papillomavirus and Genital Warts.
http://www.niaid.nih.gov/factsheets/stdhpv.htm

National Network of STD/HIV Prevention Training Centers (PTCs).
Curriculum Outline: Human Papillomavirus (HPV).
http://depts.washington.edu/nnptc/core_training/clinical/clinical_curriculum/hpv.html

Molluscum Contagiousum

Overview

For a more complete description of Genital Ulcer Disease Syndrome, refer to the following text:

- Principles and Practice of Infectious Diseases. (5th edition)
- Sexually Transmitted Diseases. (3rd edition)
- CDC Guidelines for Treatment of Sexually Transmitted Diseases

Case Definition

Diagnosis of molluscum contagiousum is based on clinical appearance of the lesions. Ability to express a lesion "pearl" is helpful.

Molluscum contagiousum is a benign papular condition caused by the molluscum contagiousum virus (MCV). It is often sexually transmitted in adults, but may be spread through non-sexual routes. It is characterized by the presence of typical firm, small (1-5 mm), fleshy papules, which are often umbilicated. A firm white "pearl" is often expressed on compression, followed by brisk bleeding. Extensive or refractory lesions, or the development of lesions in atypical locations (e.g. face) may be seen in HIV disease.

Comment

Information provided is related to but not limited to Molluscum Contagiousum.

Case/Contact Follow Up and Control Measures

See CDC STD Treatment Guidelines in the appendix.

Laboratory Procedures

Diagnosis of molluscum contagiousum is based on clinical appearance of the lesions. Ability to express a lesion "pearl" is helpful.

Other Sources of Information

Red Book, Report of the Committee on Infectious Diseases

Web Sites

http://www.cdc.gov/

Pelvic Inflammatory Disease

A. Clinical picture

Pelvic inflammatory disease (PID) is a clinical syndrome of upper genital tract infection characterized by pelvic pain, tenderness, and systemic signs and symptoms of infection. Epidemiologic and laparoscopic studies implicate gonorrhea and chlamydia as the most common causes, although anaerobes and other infectious agents have also been identified. Women with acute PID classically present with pelvic pain and cervical motion tenderness; in severe cases, tubo-ovarian abscess or perihepatitis may also be present. The differential diagnosis includes appendicitis, cholecystitis, ectopic pregnancy, or other causes of abdominal pain. While many patients with PID respond to outpatient therapy, some will require hospitalization for intravenous fluids, antibiotics, and observation (see criteria for hospitalization below). All patients for whom hospitalization is considered should be referred to a physician for immediate evaluation.

B. Diagnosis

1. History
   a. Lower abdominal/pelvic pain
   b. Dyspareunia
   c. Vaginal discharge
   d. Disrupted menstrual pattern (meno- or metrorrhagia)
   e. Fever
   f. Nausea/vomiting

2. Physical Examination
   a. Minimum criteria for diagnosis (all three must be present)
      i. Lower abdominal tenderness
      ii. Adnexal tenderness
      iii. Cervical motion tenderness
   b. Additional criteria (variably present, increase specificity of diagnosis)
      i. Oral temperature >38.3° C
      ii. Abnormal cervical or vaginal discharge
      iii. Increased sedimentation rate (ESR) or C-reactive protein (CRP) (not routinely available)
      iv. Positive test for *N. gonorrhoeae* or *C. trachomatis*

3. Laboratory
   a. Gram-stained endocervical smear
      i. Presence of many PMNs per 1000x (oil immersion) field, coupled with history and physical examination, is consistent with diagnosis of PID
      ii. Presence of GNIDs suggests gonococcal PID, but absence of GNIDs is not predictive of etiology
      iii. Few or no PMNs suggests diagnosis other than PID (e.g. tubal pregnancy, ovarian cyst, appendicitis)
   b. Endocervical test for *N. gonorrhoeae* and *C. trachomatis* (genetic probe, culture, or PCR/LCR)
   c. Rectal culture for *N. gonorrhoeae*
   d. If menses late or if patient is not using reliable contraception: check pulse and blood pressure (supine and seated), obtain sensitive pregnancy test, refer to women's health or other appropriate provider for follow-up

C. Treatment (See the CDC STD Treatment Guidelines in the appendix)
1. Inpatient
   a. Suggested criteria for hospitalization (CDC Guidelines, Appendix D)
      i. Surgical emergencies cannot be excluded (e.g. appendicitis)
      ii. Patient is pregnant
      iii. Failure to respond clinically to outpatient therapy
      iv. Unable to follow or tolerate outpatient treatment
      v. Severe illness, nausea, vomiting, high fever
      vi. Tubo-ovarian abscess
      vii. Patient is immunodeficient
   b. Inpatients should be treated as outlined in CDC Treatment Guidelines with a combination of either cefoxitin/cefotetan **plus** doxycycline (contraindicated in pregnancy) **OR** clindamycin **plus** gentamicin. Alternative parenteral regimens include ofloxacin **plus** metronidazole, ampicillin/sulbactam **plus** doxycycline, and ciprofloxacin **plus** doxycycline **plus** metronidazole.

2. Outpatient
   a. Antibiotic treatment: select one of the following antibiotic regimens (i **OR** ii)
   i. Ofloxacin (contraindicated in adolescents age <18 or in pregnant or nursing women) 400 mg PO bid for 14 days **plus** metronidazole 500 mg PO bid; **OR**
   ii. Ceftriaxone (250 mg IM single dose **plus** doxycycline (contraindicated in pregnancy) 100 mg PO bid for 14 days (NOTE: cefoxitin **plus** probenecid or another third-generation cephalosporin may be substituted for ceftriaxone, although they are less convenient and generally will not be required)
   b. Remove IUD, if present
   c. Bed rest recommended for one to three days or until pain is significantly improved
   d. Abstain from sexual intercourse for two weeks or until symptoms resolved
   e. **Follow-up re-examination within 72 hours is essential** to ensure adequate response to therapy. After 72 hours, schedule appointment with women's health or other appropriate provider. Patients should also be re-examined one to two weeks after completion of all medication.

D. Sex partners

All partners within the past three months should receive full STD evaluation, including urethral smear and tests for gonorrhea and chlamydia, regardless of symptoms. Epidemiologic treatment for gonorrhea and chlamydial infection is appropriate in most cases.

Urinary Tract Infection

Overview

For a more complete description of urinary tract infection, refer to the following text:

- Control of Communicable Diseases Manual (CCDM)
- Red Book, Report of the Committee on Infectious Diseases
- Sexually Transmitted Diseases (third edition)

Case Definition

For diagnostic purposes, a confirmed case of urinary tract infection is one that meets both clinical and laboratory criteria.

Clinical Description

Urinary tract infections (UTI) are much more common among women than men. Patients with UTI typically present with symptoms of urgency, frequency, dysuria, suprapubic pain, or hematuria. If flank pain or fever is present, then pyelonephritis should be considered. Sexually transmitted urethritis can also cause symptoms of dysuria, so all patients should be evaluated thoroughly for possible infection with chlamydia, gonorrhea or herpes.

Comment

Information provided is related to but not limited to chlamydia and gonococcal infections.

Laboratory Procedures

1. Leukocyte esterase (LE) test on midstream urine sample
   a. If positive, confirm pyuria by microscopic examination
   b. If negative, microscopic exam/culture usually not indicated

2. Urinalysis
   a. Women: centrifuged midstream specimen showing ≥15 WBC per high-power field or unspun urine showing >1 WBC per high power field; WBC clumps, RBC, or

bacteria may also be seen. Presence of squamous epithelial cells indicates poor clean-catch technique and reduces the diagnostic value of the test.

b. Men: obtain both first void (10-15 ml) and mid-stream urine specimens. UTI is suggested by ≥10 WBC per high-power field in the centrifuged midstream specimen, plus first-void specimen showing fewer or equal numbers of WBC compared to midstream; the reverse (first-void WBC > midstream WBC) suggests urethritis.

3. Urine Gram-stain on uncentrifuged urine
   a. ≥1 organism per 1000X (oil immersion) field in presence of pyuria strongly suggests UTI
   b. Negative Gram stain does not exclude UTI

4. Urine culture
   a. $<10^2$ organisms/ml: no infection
   b. 10^2-100^3 organisms/ml: interpretation depends on organism isolated. Isolation of *E. coli*, *S. saprophyticus*, *Klebsiella* or *Proteus* usually indicates infection
   c. $\geq 10^4$ organisms/ml, typical uropathogen: confirms UTI
   d. ≥2 organisms present can indicate either infection or contamination

Other Sources of Information

1. Chin, James, ed. "Gonococcal Infections" *Control of Communicable Diseases Manual* (CCDM), 17th ed. Washington, D.C.: American Public Health Association, 2000: 223 – 227
2. American Academy of Pediatrics. "Pelvic Inflammatory Disease" 2000 Red Book: Report of the Committee on Infectious Diseases. 25th ed, Elk Grove Village, IL. 2000: 431 – 435

Acute Epididymitis

Overview

For a more complete description of Acute Epidiymitis infection, refer to the following text:

- Control of Communicable Diseases Manual (CCDM)
- Red Book, Report of the Committee on Infectious Diseases
- Sexually Transmitted Diseases (third edition)

Case Definition

For diagnostic purposes, a confirmed case of acute epididymitis is one that meets both clinical and laboratory criteria.

Clinical Description

Epididymitis is characterized by scrotal pain, swelling and exquisite tenderness of the affected testicular-epididymal complex. Symptoms usually develop and intensify over a one to two day period, but both gradual onset and acute onset of symptoms may be seen. Pain and tenderness are generally unilateral and signs and symptoms of urethritis are often, but not always, present. In sexually active men <35 years old, the most common pathogens are *N. gonorrhoeae* or *C. trachomatis*. Coliforms such as *E. coli* are most common in the following groups: (a) men >35 years old, (b) men of any age who have recently undergone urinary tract instrumentation or surgery, and (c) homosexual men who practice insertive anal intercourse.

Comment

Information provided is related to but not limited to chlamydia and gonococcal infections.

Laboratory Procedures

1. Physical examination reveals epididymal and/or testicular tenderness, swelling, and induration. Urethral discharge may or may not be noted.

2. Laboratory testing should include the following:
   a. Urethral Gram-stained smear
   b. Urethral culture, genetic probe, or DNA amplification test for *N. gonorrhoeae*

c. Urethral culture, genetic probe, or DNA amplification test for *C. trachomatis*
d. Midstream urinalysis, Gram stain, and bacterial urine culture

References and other Sources of Information

1. Chin, James, ed. "Gonococcal Infections" *Control of Communicable Diseases Manual* (CCDM), 17th ed. Washington, D.C.: American Public Health Association, 2000: 223 – 227
2. American Academy of Pediatrics. "Pelvic Inflammatory Disease" 2000 Red Book: Report of the Committee on Infectious Diseases. 25th ed, Elk Grove Village, IL. 2000: 431 – 435.
3. Centers for Disease Control and Prevention, case definition for Infectious Disease Web Site, http://www.cdc.gov/std/treatment/htm